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ABSTRACT

This paper shows features the development of new models for integration of internal and external students into the same type of courses and the making of a dual mode learning environment with common courses for on-campus and external students. Based on feedback from students, experiences about how these models work are presented. The work focuses on changing the student from being a passive listener to an active learner. A tool to implement interactivity with the course material presented on the Internet is described. Findings are presented related to student expectations, results and final scores, transformation of a physical classroom to an electronic learning environment, and practical reasons for ODL (Open and Distance Learning) courses. By using methods based on ICT (Information and Communication Technology) tools, teachers can rationalize the time spent on theoretical subjects and increase the time spent on interaction with students. (MES)

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ED 444 472

Evaluating new ICT-based models for teacher training

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Abstract: This paper shows how we have developed new models for integration of internal and external students into the same type of courses, and made a dual mode learning environment with common courses for on-campus and external students. Based on feedback from students, we present our experiences about how these models work. In our work we focus on changing the student from being a passive listener to an active learner. We present a tool to implement interactivity in the course material presented on Internet.

Introduction

Over the past eight years we have through our R&D work been experimenting with different models for teaching ICT skills to teachers. The courses have gradually evolved from traditional lectures in the classroom, to Open and Distance Learning (ODL) courses. We have developed, implemented, tested and evaluated different models where the physical location of the student is of less importance compared to methods of presentation. We very much work towards a situation where we can call a student a student, and not focus on whether he or she is actually an internal or an external student. The focus is on what methods to use in working with the content. This means in practice that internal and distance students are participating in the same courses and working with the same material. They take part in the same electronic conferences, and participate in the same discussions. An important goal of this work is to make models for teaching which is the same for both internal and external students. By developing these new models we also try to find new ways of teaching on campus, making the internal students more responsible for their own learning, where the teachers are tutors or guides in the learning process. In our work we have used different tools to make an interactive learning environment where students take an active part.

Our work is based on cooperation with different institutions in Norway and Europe through various projects. For three years we participated in the European JITOL (Just In Time Open Learning) project, which is a European project for developing courses in an ODL environment. Towards the end of the JITOL project work continued in a similar Norwegian project NITOL (Norway-net with IT for Open Learning). Through this project four institutions have worked together to make a common course pool. The last and most comprehensive project we participate in is the Norwegian Network University (NVU). This is a joint project with seven Norwegian Universities and higher education institutions, making a common course pool for Open and Distance Learning in higher education in Norway.

Organization of the Courses

In our courses we provide the majority of learning material through Internet. In this material we include references to books and URLs, integrate video shots to illustrate actions and so on. On Internet we

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present exercises and assignments as a part of the course. Internet is also used as a forum for discussion and exchange of views and experiences according to the learning material and assignments. This is building an electronic learning environment where both learning material and student work are presented and discussed.

The contact with the students is also done electronically. Student assistants and teachers are made available for net based interaction and guidance, and tools like IRC are used to create cooperating groups.

This is done both for external students and for internal students that attend the course in a more «traditional» way. All the content of the course is presented on Internet and internal students have to read and work with this material in order to prepare for the classes. The teaching in the classroom is no longer dominated by lectures from the teacher where students are passive listeners, but guidance related to the material and assignments in the course. This guidance and these discussions are also made through electronic conferences, and IRC, in order to include the external student in the discussions. Since external students take the same courses as internal students without showing up on campus, the teaching is becoming an «extra service» for the internal student, and not an absolutely necessary part of the course. Internet is gradually becoming the arena for teaching and guiding, and the problem based learning method is becoming rather dominating.

Another important factor is to make interactivity in the course material in order to force the students to take an active part in the course. In some of our courses we «open» the material, and the students can add information to the content, ask questions, show examples and present personal experience directly in the material, not in a separate newsgroup. This is done by letting the student make *annotations* to the material. This is making the curriculum a «living» learning environment, and not a static material that is made once and for all by the teacher. To make such an interactive material, we use a tool called WebOrama. The WebOrama is a tool in the SHARP project (http://www.softlab.ntua.gr/sharp/).

WebOrama is a system where video clips, sounds and texts are integrated and played or showed as sequences. The way we use WebOrama is to start a video sequence and on certain predefined points, annotations are shown or started as other video sequences, sounds or texts. Annotations are used to give additional explanations to a video clip, text, sound and so on. In this way we organize the video sequence as a hyperstructure, not as a linear sequence. Annotations can both be shown automatically, or as a consequence of user interactivity. These annotations are usually programmed by the author of the sequence, the teacher, but an important point is that new annotations also can be made by students. These new annotations will be integrated in the sequence in the same way as annotations made by the teacher. In this way we can make the course material increase by student activity and participation in the course.

A video clip in WebOrama is shown in e.g. AVI-format, ASF-format or as a GIF-animation. The buttons below the picture can be used to add different types of annotations:

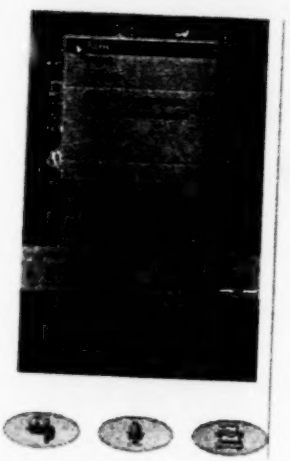

Figure 1: WebOrama with a video clip and buttons for definition of annotations.

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To a video clip we can typically have a list of annotations. The user can click on these annotations to start another video clip, a sound file or a text. These annotations are defining the hyperstructure in the WebOrama sequences:

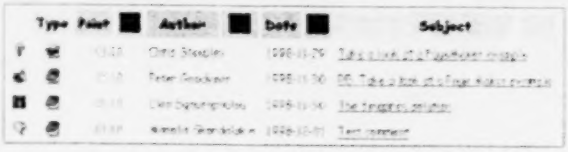

Figure 2: List of annotations in WebOrama.

The main structure is the video clip. When the video clip is shown, the time is the trigger to show the annotations. Annotations can be made to the main video sequence, but also to other annotations. This is building a hyperstructure with no limits according to levels of annotations in the sequence.

The WebOrama is one example of tools we use to increase interactivity in the course material. By using this tool, we enable the students to be active in the learning process, and to participate in developing the content of the course by making annotations. Annotations made by students are available to all other participants.

Annotations made directly to the course material, and in the material itself, will make a strong connection between the original material and the problems, questions, answers or comments to the content. The separation of the content and the place to interact with fellow students and the teacher seems to be a factor that disadvantages the use of newsgroups in this kind of interaction.

WebOrama is not implemented as a groupware, but on some points it is similar to how groupware works. In WebOrama the students and the teacher work on the same document, and all changes and additions that are done are published to all other participants. The main difference between WebOrama and «traditional» groupware is that in WebOrama the students do not work simultaneously on the same document. This prevents the student from real-time teamwork, but this system helps the students to cooperate and to work on the same content. The WebOrama system provides a simple and efficient way of publishing changes and new content in the work.

From Teaching to Learning

Maybe the most important factor and goal in our work is to change the students' attitude from being passive listeners to active learners. This has important and rather dramatic consequences both for the teacher and the student. In our courses the teacher is no longer an oracle. He is more of a guide. The teacher is no longer the most important person in the learning process because of what he teaches in the classroom, but rather because of the learning environment he makes to stimulate the students' learning.

For the students one consequence of their new role is to a much greater extent to take responsibility for their own learning and education. Much of the work in the courses requires student activity to solve different tasks. The amount of time used for *teaching* the students is reduced, and replaced with more time for the students to *learn* through their own work.

The three most important factors in our courses are *engagement*, *work* and *guidance*. Because of the integration of internal and external students in the same learning group, much of the traditional teaching has to be replaced by individual work, and work in groups of students. The course material on Internet shall not be a complete description of everything the students have to learn and to know for an exam, but rather be a trigger to the work of the students themselves. Students are guided to overcome difficulties in this part of the course. Input to students is very often based on the work done by the student, so the engagement and participation in the course plays an increasing role in how far into the curriculum the students are able to work.

Without work and engagement the students are not likely to learn. Teaching cannot replace the work done by the student. With traditional teaching to groups of low student engagement, no one but the teacher is likely to learn anything!

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Findings

Through our work where we have organised the courses according to new models for teaching, we have systematically collected information about how these new models work. These data are organized in a database, and can be used to draw some conclusions about how the models function and give ideas about how they can be improved.

Even though we treat the internal and external student almost the same way, we notice some differences between traditional, internal students that work together on campus, and external students who very often are working alone and therefore have to use only electronic tools to interact with other students and the teacher.

Expectations

The majority of internal students still have expectations of getting traditional lectures as the dominating teaching method when they join a course. The content of the course is to be learned through lectures and a predefined curriculum. The attitude is still very often based on behaviouristic learning theory, and the belief that «someone can teach someone something», and that this is the best way of learning. This may be an effect of our examination system, where facts and information are asked to be recalled or reproduced. But does this actually test what is learned, and are the students in this system only motivated for using methods that make high scores in an exam? Do they really learn out of their own needs?

The traditional «delivery» of facts and science material in the classroom, or over Internet should not be confused with learning. This material should be considered as information-until the students have treated it and gained some kind of knowledge. This is similar to databases. A database only stores data, and these data have to be interpreted to become information. In our courses we focus on constructivistic learning theories and do not only base the course on delivery of information to students. Our students have to work throughout the entire courses to gain their own knowledge and understanding of the content.

In the beginning our students can be a little confused, and have some problems to get started with the work. Many students need some time to adjust to the new way of working, when the courses very much are based on activity from the student in relation to the teacher as a guide, not as a lecturer. But the feedback from the students shows that after adjusting to this way of working, they find these models to be an efficient way of working and learning. They actually need some time to shift focus from listening to working.

In our courses we focus on using Internet as an interactive working arena. Internet must not be used as an excuse for presenting linear text, but as a tool to increase student activity. If knowledge is gained through work, Internet must be more than a delivery system for information. It has to be a place for working.

Results and Final Scores

The results and scores on final exams and compulsory work are the easiest factors to test and to compare with results from other courses. Over the past years we have seen that increased emphasis of active students, problem-based working methods, makes better scores on the final exam. The exam is still the same, but the results are better. This means that even though the courses do not focus as much as before on lecturing, teaching and a predefined curriculum, our experience is that the students learn more and better.

The feedback from many students reflects an attitude that they learn the curriculum out of their own needs, not with the exam as the only goal. The student finds the curriculum of the courses important to learn, and we find that this new way of working has adjusted the courses to the students' need of knowledge and skills. The methods and the content fit together.

According to how males and females score in the courses, no major differences can be spotted in the results.

In our courses we treat internal and external students the same way. The courses are actually taught over Internet, and the use of lecturing and guidance in the classroom can be considered as an «extra service» for the students that show up on campus. In this way we can say we still have some differences in teaching

internal and external students. If we look at differences in scores between these two groups of students, we can see that external students score equally or even better than internal student, both on final exams and on compulsory work. There can be many explanations to this, but we believe that when external students have to rely on the Internet based course, this inspires them to work more. And when they do not meet in the classroom, it is more obvious that the only way to learn is through their own work. We also find that many external students are older than the internal students, and therefore are more experienced learners, even though their experience may not directly be related to the content.

Transformation of a Physical Classroom to an Electronic Learning Environment

One important challenge in ODL courses is to create an electronic learning environment. How do we integrate external students into a common environment where they interact with each other and the teacher, and how are internal and external students organized into one group through electronic tools? As we often see in different courses, the interaction in a physical classroom cannot directly be transformed to an electronic learning environment. For instance the participation in electronic conferences can be limited. Feedback from many students tells us that they do not always want to ask questions in an open environment like a news conference. To help this interaction we have closed the conference for participants outside the course. Direct interaction with teacher and other students through e-mail, is more popular, because it is a closed interaction between two or a limited number of persons.

Another factor that seems to disadvantage the news groups and also to some extent the e-mail as a tool for interaction between students, is that these tools often function as a separate and not integrated system in the curriculum. The distance between the content and the arena to ask questions, make references, interact with others and so on, may in many situations be too big. The integration of curriculum and student activity, like the one in the WebOrama system, can help to overcome some of the problems related to interaction with the course material.

One of the major challenges in ODL courses, is to integrate and use electronic tools that allow and motivate the students to interact.

According to feedback from the students, we find that the search for information on Internet is efficient. Searching on Internet is a well established method for getting information, and is easy to integrate as a tool in the curriculum. In practice this means that the teacher as a resource of information can be replaced by these tools.

Groupware must also be evaluated as tools in electronic learning environments. The importance of these tools will depend on need for synchronism in student work. Our experience is that these tools function as a meeting point for chatting and for making appointments. Cooperating students often work individually, and at defined points present framework for discussion. Usually they do not work simultaneously on the same document.

Practical Aspects

Many students attend ODL courses for practical reasons. Because of work, family, physical location and so on, they are prevented from showing up on campus, and the only realistic alternative to get an education is to attend ODL courses. This is actually an important argument for making ODL courses in Norway. They are needed for practical reasons to implement lifelong learning. An important finding is that the organisation of the study as ODL courses from the students' point of view do not reflect negatively on the outcome of the courses.

Based on the given feedback and results in the courses, we see that the combination of education, work, family and so on forces the external student to be efficient. They do not have time to surf on Internet unless it is related to their work. This is a factor that we also believe has an impact on the score and results of external students. The efficiency can help them to focus on the important items and to work with them, and not sort of flounder around. This is something we see more of among internal students.

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Conclusions

Our experiences are based on developing and producing courses to provide ICT skills and ICT knowledge to teachers. We use ICT to create an electronic learning environment for learning ICT. An important goal is also to implement our experiences in other topics and subjects within teacher training. The use of new models for learning and the emphasis on using ICT should not only be related to teaching ICT.

The models developed for teaching ICT skills can be used to change parts of the teaching in other topics. At least 50% of what the lecturers are teaching verbally can be presented as hyper structured interactive lessons on Internet. Instead of talking to a passive audience, the lecturers can use their time as advisors and mentors for the students. And the students should use their time working, not just listening! The teachers in teacher training must change the way they work.

To change the methods used in initial teacher training in Norway is a great job. By using methods based on ICT tools, we can rationalize the time spent on theoretical subjects, and increase the time spent on interaction with students.